The Strategy and Realization of Enterprise Integration

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by

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Certificate of Authorship and Originality

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I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

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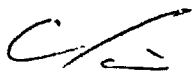

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Abstract

In recent years we have experienced exponential growth in business innovation, emerging technology, and integration complexity. With this unprecedented growth, the priority of enterprise integration has shifted from patching solutions to the governance of agility. Enterprise integration mainly deals with interoperability between virtual and physical worlds, which is thorny by its very nature. In order to cope with rising complexity, interference coherence between business, service, and physical components is crucial. Instead of consolidation from fragmentation, an iteration approach is taken in driving concept and strategy into realization. The empirical statistics indicate that the anatomy of ontological research is essential for producing an overview of interoperability. The author's numerous research projects demonstrate a number of factors critical in generating higher productivity and lower risk. These factors include a higher visibility of atomic elements, a well-specified service, and a precise architectural alignment.

By taking these successful factors into realization, this thesis proposes enterprise vertical integration, employing a three-step strategy of componentization, transformation, and virtualization. Componentization derives an ontology of atomic elements for the service-based foundation. In transformation, service components are produced from these raw elements, using a multi-discipline and three-dimensional approach to achieve component synthesis. The final step, virtualization, is the objective of enterprise integration. Virtualization establishes the enterprise skeleton and achieves a common-service mainstream in the industry. Experiential evidence indicates that this higher-level, three-step approach works effectively in minimizing risk and increasing productivity. There is particular benefit for projects of higher complexity and larger scale.

Given the incessant business change inherent in our chaotic new age of computing, the three-step approach relies on a new framework to streamline realization and cope with project complexity. A Method, Evaluation, Techniques, and Application (META) framework addresses the interference between virtual and physical layers. In this initial process it develops component validation, analysis processes, and synthesis techniques for service transformation.

It then develops service components and common services for service virtualization. This thesis proposes a four-pillared approach to support the META framework. It also proposes sub-area concepts such as "pattern" and "state" to enhance the capability of the framework before moving it into the industry mainstream.

This thesis distinguishes itself from existing literature in that very few studies in this field address real enterprise-scale integration. None of the reviewed literature copes with the fundamental work of enterprise issues such as ontological research or high-level strategy as proposed by this thesis.